



## *EPA Region 7 TMDL Review*

<b>TMDL ID</b>	335	<b>Water Body ID</b>	IA 04-UDM-01020
<b>Water Body Name</b>	Silver Lake (Palo Alto County)		
<b>Pollutant</b>	Algae and Turbidity		
<b>Tributary</b>	Drainage Ditch No. 6, unnamed creeks (3)		
<b>State</b>	Iowa	<b>HUC</b>	0710000204
<b>Basin</b>	Upper Des Moines River		
<b>Submittal Date</b>	12/28/2004		
<b>Approved</b>	Yes		

### **Submittal Letter**

*State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.*

The TMDL for Silver Lake was formally submitted by the Iowa Department of Natural Resources (IDNR) in a letter dated December 14, 2004 and received by EPA on December 28, 2004.

### **Water Quality Standards Attainment**

*The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.*

The Trophic State Index (TSI) was used to link the concentration of total phosphorus to the quantity of algae and turbidity in the system. A TSI for total phosphorus (TSITP) <70 was set as a target to achieve TSIs for chlorophyll (algae) and Secchi depth (turbidity) of <65. TSIs of <65 would meet the standard for algae and turbidity. The loading capacity for total phosphorus is set as a combination of reduction in internal and externally loaded phosphorus.

**Numeric Target(s)**

*Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.*

Water quality standards and beneficial uses are described as well as applicable narrative criteria. Designated uses are A1 (primary contact recreation) and B (LW)(aquatic life). The standard is narrative and states the designated uses are hindered due to excess nutrient loading and impaired aesthetics. In 2002 the Class A use designation was assessed as "partially supporting" due to the presence of aesthetically objectionable blooms of algae and presence of nuisance algal species. The Class B use was also assessed as "partially supported." The relationship of phosphorus to algae and turbidity expressed by the lake's TSI was used to derive the target phosphorus load.

**Link Between Numeric Target(s) and Pollutant(s) of concern**

*An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.*

This TMDL uses the surrogate measure of TSI which links phosphorus concentrations to algal and turbidity conditions. By reducing the TSI for total phosphorus to <70 the TSIs for chlorophyll and Secchi depth should be reduced to <65 based on the relationships seen in this lake. The minimum in-lake reduction in total phosphorus to meet this goal is 60% which should result in a reduction of 63% for chlorophyll and an increase in transparency of 133%.

**Source Analysis**

*Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.*

Sources of phosphorus loads are watershed nonpoint sources including row crop agriculture, five Confined Animal Feeding Operations (CAFOs), an open feed lot and atmospheric loading. Modeling indicates an internal load of approximately 6% of the gross total phosphorus, in terms of lake response this accounts for 19% of the resultant in-lake loading effect because of the greater availability of this nutrient component. Other possible sources include septic systems and pit toilets from campsites, residences and seasonal businesses as well as waste and manure from wildlife and pets. These other sources are considered to have less impact and will be evaluated in Phase II of the TMDL. All significant sources of phosphorus seem to have been considered.

**Allocation**

*Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.*

Phase I of this TMDL is to reduce phosphorus loading to achieve an in-lake TSITP<70 resulting in TSIs for Secchi depth and chlorophyll of <65. This should be accomplished with a total phosphorus load allocation of from 2,260 pounds to 4,390 pounds per year depending on the relative contribution of internal vs. external phosphorus load. This relationship is defined in a table in the TMDL.

#### **WLA Comment**

There are no significant point sources for phosphorus in the watershed. The WLA is set to zero.

#### **LA Comment**

The load allocation based on target TSITP<70 is on a sliding scale depending on what proportion of the load is internal versus external. With a zero internal load the load allocation is 4,390 pounds of phosphorus per year (all externally loaded). With a 610 pound internal load the total load allocation is 2,660 pounds per year (2,050 pounds are externally loaded). The TMDL uses a table to quantify load allocation based on varying internal and external loads.

#### **Margin of Safety**

*Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.*

The margin of safety is based on using a target in-lake concentration of total phosphorus 10% below the desired endpoint concentration. This target is an explained implicit MOS.

#### **Seasonal Variation and Critical Conditions**

*Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).*

The TMDL was based on a model which uses annual phosphorus loading to determine growing season total phosphorus concentrations which define the TSI targets.

#### **Public Participation**

*Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).*

TMDL staff met with the Palo Alto County Conservation Board on June 10, 2004 and with the Palo Alto Soil and Water Conservation District on June 29, 2004. IDNR held a public meeting September 20, 2004 and made the TMDL available for public comment. Comments received were evaluated and incorporated into the TMDL where considered appropriate.

**Monitoring Plan for TMDL(s) Under Phased Approach**

*The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).*

Follow-up monitoring will continue to meet, at a minimum, the minimum data requirements established by Iowa's 305(b) guidelines. An assessment will be completed by 2010 containing 3 lake samples per year for three years or 10 lake samples over a two year period.

**Reasonable assurance**

*Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.*

There are no waste loads allocated in this TMDL, there are no allowances for foreseeable increases in pollutant loads.

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